



Assessing Awareness about Volta Basin Authority, Code of Conduct and Water Governance Challenges in the Volta Basin

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Abstract— River basin organizations have taken shape in different parts of Africa partly under the influence of international aid institutions that aimed to help prevent water conflicts among basin countries. The code of conduct and the Volta Basin Authority (VBA) exemplify one of most recent efforts to collaboratively govern a major transboundary basin of western Africa. The question, however, remains as to the extent to which culturally diverse local communities can be mobilized and integrated in water governance. No study has clarified this point. This paper, therefore, attempts to better understand local stakeholders' perceptions and needs to collaboratively govern transboundary water between Ghana and Burkina Faso. For this research, we conducted preliminary field visits and questionnaire surveys in both countries. We found that 84% of the respondents in Burkina Faso and 91% in Ghana did not know about the VBA. Some respondents, especially educated ones in both countries, did hear about the code of conduct. Regarding local needs for water governance, most respondents in Ghana expressed concerns about frequent flooding due to Bagre Dam spillage in upstream Burkina Faso that devastated their farms. This research then discusses how transboundary water governance in the Volta River Basin can be improved in the future.

Keywords— Volta River Basin, riparian awareness, water governance challenges, Burkina Faso, Ghana.

I. INTRODUCTION

Proponents of transboundary water management have long sought for an effective cooperation mechanism among basin countries partly to prevent or mitigate water conflicts (Islam and Susskind, 2013). As early as 1908, the United States and Canada established the International Joint Commission (IJC) by signing a treaty to collaboratively govern shared water resources (Chacko, 1932). Since then, many transboundary water agreements were signed partly to establish river basin organizations (RBOs), which, to some extent, affected how nations and jurisdictions may share water sources (Priscoli and Wolf, 2009). These organizations also have institutionalized water conflict resolution mechanisms (Schmeier, 2013).

Wolf et al. (2003) identified 17 water conflict prone river basins in the world, of which eight basins belonged to the African continent. Somewhat following American and European examples, African nations have formulated several transboundary water organizations, such as the Lake Chad Basin Commission (1964), Niger Basin Authority (1980), Permanent Okavango River Basin Water Commission (1994), and Zambezi Watercourse Commission (2004), among others. UN organizations were often involved in the formulation of these organizations. For example, in 1997 the UN Watercourses Convention emphasized international cooperation in managing transboundary watercourses. In western Africa, the World Bank, the Economic Community of West African States, and the European Union Water Initiative have supported the establishment of a cooperation mechanism among six

riparian countries of the Volta River Basin since the 1990s (Opoku-Ankomah et al., 2006; World Bank, 2015; Yankey, 2019).

Partly in response to this transboundary collaboration movement, Burkina Faso and Ghana established the code of conduct for the sustainable and equitable management of the Volta Basin. This was facilitated under the Project for Improvement of Water Governance in the Volta Basin (PAGEV). To faithfully follow this code, the two countries established the Joint Technical Committee on Integrated Water Resource Management (JTC-IWRM) in 2005. At a follow-up validation meeting in 2006, the JTC-IWRM finalized the language in the code (Welling et al., 2014). The directorate of water resources in both countries jointly spearheaded the development of the code of conduct.

This code of conduct defined tasks and obligations of riparian states. It contains eight sections and 59 articles. Some articles provide guidelines for decision making and the implementation of water governance interventions. It laid out nine principles for the rational and sustainable use of basin resources which are somewhat similar to international water law principles on shared water resources (Ampomah et al., 2008). These principles are: (1) equitable resource use and participation, (2) cooperation, (3) regular data and information exchange, (4) notification of planned activity, (5) ecosystem protection and preservation, (6) non-maleficence, (7) emergency notification, (8) freedom for navigation, and (9) precaution and prevention (Yankey, 2019). The code of conduct, however, is not published for the readership of the public.

Despite this agreement, water resource use in both countries remains virtually unchanged partly due to lack of institutional frameworks to ensure the implementation of the code. The Volta Basin Authority (VBA) was expected to fill this gap. In 2004 a joint declaration agreement was signed by Burkina Faso and Ghana. A few months after the enforcement, these nations invited all the other riparian countries of the Volta Basin to join and formulate a similar transboundary water governance framework (Mali, Togo, Côte d'Ivoire, and Benin). In November 2004, all responsible ministers of the six basin countries came together and signed an agreement that established the Volta Basin Technical Committee (VBTC). On December 6, 2005, these countries also signed a memorandum of understanding (MOU) to establish the Volta Basin Authority (VBA) (Opoku-Ankomah et al., 2006; World Bank, 2015; Yankey, 2019). These efforts resulted into the establishment of the Volta Basin Authority (VBA) in 2007 (which came into effect in 2009) (Global Water Partnership, 2014; Amuquandoh, 2016).

The establishment of this Authority was a major step toward a collaborative governance. The Volta River Basin affects water supplies for about 24 million people (as of 2010) and this number is expected to reach 33.9 million in 2025. Riparian communities in this Basin are largely rural and poor, engaging in small-scale agriculture (UNEP/GEF-Volta Project, 2013; Global Water Partnership, 2014). Considering this socio-economic situation along with cultural diversity, the fundamental question is how the VBA can implement its policies effectively among its diverse members, and to what extent local participation can be achieved. Article 6 of the Volta Convention mandates it to promote consultation and partnership among these people. It also encourages the implementation of integrated water resources management (IWRM) and the equitable distribution of benefits. As water conflicts tended to emerge due to dam construction and its release of reservoir water, which can flood lower basin communities, the VBA further instructed member nations to obtain its assessment and approval in order to execute infrastructure developments that have the potential to inhibit water flow (Yankey, 2019; IEADB, 2020). The 2015-2019 Strategic Action Plan of the VBA further aimed at enhancing stakeholder participation through enhanced communication (World Bank, 2015).

Gerlak and Schmeier (2018) noted that RBOs are effective when they contribute to behavioral change of riparian communities towards sustainable transboundary water resource governance. The effectiveness of the VBA, however, has been questioned by scholars. Gao and Margolies (2009) found that the Basin had suffered increasingly from deteriorating water quality in the last ten years. Several other scholars stressed poor coordination among the six countries for flood risk assessment and planning (Obrecht and Mead, 2014; World Bank, 2015; Yankey, 2019). The World Bank (2015) also observed increasing extreme climate events, continuing deforestation, and soil degradation. Yankey (2019) further noted that the VBA was not respected by stakeholders. IUCN (2012) encouraged the VBA to show tangible results and improvements to water users in order to have good community participation at transboundary levels.

One of the most contentious issues that gained attention from scholars was the controversy over Bagre Dam spillage near the Ghana-Burkina Faso border (Amuquandoh, 2016; Yankey, 2019). Some studied the effect of Bagre Dam spillage on downstream watershed areas in Ghana (Matthews, 2012; Mul et al., 2015; Ampomah, 2017). Another group of researchers focused on water allocation between the two countries (Andreini, 2002; Leemhuis et al., 2009; Baah-kumi and Ward, 2020). Some studies looked at institutional arrangement for

undertaking integrated water resource management in this border area (Opoku-Ankomah et al., 2006; Agyenim, 2011).

However, for the VBA to engage in meaningful consultation and induce active participation among smallholders, it is imperative to better understand the level of awareness and needs among riparian communities (Koop et al., 2017). Awareness means a good comprehension of causative factors as well as effects and dangers associated with governance challenges. A lack of awareness of government policies on flood management by local communities in Ghana was identified as a major barrier to stakeholder participation in water resource protection (Gyireh and Nunbogu, 2015). They recommended the adherence of the principle of free, prior, and informed consent (FPIC) in engaging with the public regarding water governance. The international water law principles on shared water resources also emphasized the need for prior consultations with all stakeholders and the duty to cooperate and to negotiate, among others (Ampomah et al., 2008).

Heeding to these suggestions and partly attempting to fill out research gaps we identified above, this paper seeks to find factors that have prevented the effective implementation of transboundary governance in the Ghana-Burkina Faso border area. As the eight principles of the code of conduct generally emphasize the importance of meaningful participation and consultation among stakeholders, this paper tries to better understand riparian communities' awareness of critical water governance issues in the study areas. This examination can help identify factors that have prevented policymakers from effectively coordinating water policies in these two countries.

II. METHODS

2.1 Study area

As one of the most critical issues of the Volta River water use has been related to Bagre Dam spillage, we chose to focus on two main areas that have been reported to be most affected by the spillage, including Bagre District of the Eastern Central Region of Burkina Faso and the so-called Bawku zone of the Upper East Region in Ghana (Figure 1).

In 2019, we conducted a preliminary field visit in this area and interacted with some community members in order to collect information about dam spillage and flood impact issues. We found that downstream communities below Bagre Dam both in Burkina Faso and Ghana had

frequently suffered from flooding due to its regular spillage (Gao and Margolies, 2009; IIED, 2020).

The town of Bagre is known for its agribusiness projects in connection to the dam. It is home to 19,164 people from various ethnic groups (City Population, 2020). The climate in this area is characterized by dry (harmattan) and wet (rainy) seasons with an average annual rainfall of 1,000 mm (Coche, 1998). Its vegetation is predominantly covered with scattered shrubs, short grasses, and acacia trees. Crop farming, livestock breeding, and fishing constitute main livelihood activities. Rice, maize, vegetable, and fruit plantations are main farming activities (City Population, 2020).

The economy of the Bawku zone largely depends on agriculture, which employs about 80% of the population (Ghana Statistical Service-Bawku Municipality, 2014). The climate here is characterized by the wet season from May to October and the dry season from November to April. An average annual rainfall ranges from 950 mm to 1,100 mm. The vegetation here is like the study area in Burkina Faso. Riparian communities conduct limited irrigation by drawing water from the Volta River. Major food crops here include maize, rice, sorghum, pepper, watermelon, and onion (Ghana Statistical Service-Garu, 2014; MOFA, 2015). The construction of Kpalugu multi-purpose dam in downstream Ghana commenced in April 2020. Once completed, it will be the first storage dam in this part of the Basin to provide irrigation water to farmers (Construction Review Online, 2020).

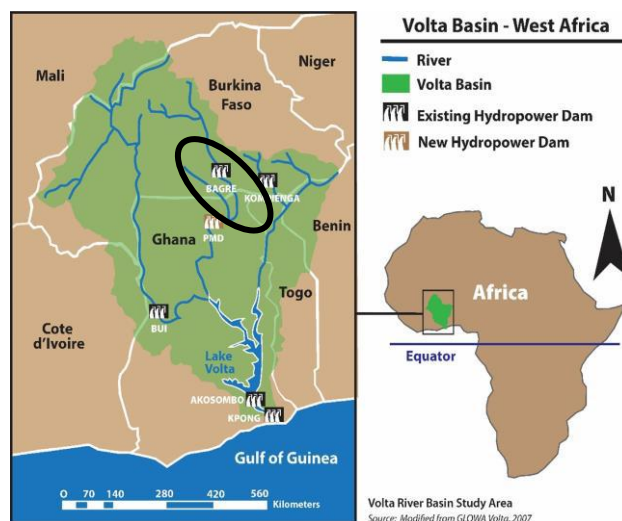


Fig. 1. Map of the Volta River Basin showing the study area in circle

(Source: Baah-kumi and Ward, 2020).

2.2 Data collection and analysis

In December 2019 and January 2020, we conducted questionnaire surveys in the two study areas along the Volta River. In Burkina Faso's Bagre District, we randomly sampled 30 residents each at Poanga, Benkaku and Dirlakou communities. In the Bawku zone of Ghana, we randomly distributed the questionnaire to 50 residents each at Azum-Sapeliga, Gentiiga and Songo communities. Our selection of sampling sizes was based on the population differences between these two areas. A population of Bagre District was 19,164 (CityPopulation, 2020) and that of Bawku zone was 290,117 (Ghana Statistical Service, 2014). Due to their limited reading and writing skills, we obtained support from local enumerators and administered the questionnaire by translating English into local languages called *Mossi* in Burkina Faso and *Kusaal* in Ghana. The response rate was 100% in Burkina Faso and 99% in Ghana. Altogether we collected 238 valid responses.

The questionnaire had three parts. The first part attempted to identify the socio-demographic characteristics of our respondents. The second part tried to understand community members' awareness about water governance in the Volta River Basin. The third part focused on water governance challenges. The questionnaire responses were coded and entered in the Statistical Package for Social Sciences (SPSS version 23) worksheet for analysis. Descriptive statistics in the form of frequencies and percentages were largely used to discuss the results. We also used the Pearson Chi-Squared to understand correlations between respondents' socio-demographic characteristics and their awareness (Kent State University Libraries, 2020).

The null hypothesis (H_0) of the Pearson Chi-Squared (χ^2) analysis was that there is no significant difference between respondents' socio-demographic characteristics and their awareness about the code of conduct, VBA, and being key stakeholders of VBA. The alternate hypothesis (H_a) was that there is significant difference between respondents' socio-demographic characteristics and their awareness about the code of conduct, VBA, and being key stakeholders of VBA. The null hypothesis was tested at 0.05 level of significance. H_0 was rejected if the p-value is lower than the significance level. However, when the p-value is higher than the significance level, then we accept H_0 .

III. RESULTS AND DISCUSSION

3.1 Socio-demographic characteristics of the respondents

Among the 238 valid responses, 148 were from Ghana and 90 were from Burkina Faso (Table 1). In terms of gender 66% in Ghana and 50% in Burkina Faso were males. The mean age among the Ghanaian respondents was 39.7 years old whereas that in Burkina Faso was 40.5 years old. About 93% of the Ghanaian respondents belonged to either the 40-59 age group (57%) or the 18-39 age group (36%). In Burkina Faso, the 40-59 age group consisted of 37% whereas the 18-39 age group had 53%. To place these age differences in a context, according to the World Bank (2020), average life expectancy in Burkina Faso is 61 years old, and that of Ghana is 64 years old (World Bank Group, 2020). Among them, 62% in Ghana and 30% in Burkina Faso were household heads.

The results on economic aspects show that the Bawku respondents (Ghana) were largely farmers (98%). In Burkina Faso, 70% was farmers. The rest was mainly engaged in trading (18%) and teaching (7%). Only 1% of the Ghanaian respondents were engaged in trading on the contrary. These differences mean that, in Bagre District, the Bagre Dam irrigation project had induced occupation diversity. The residents here typically engage in fishing, rice farming and vegetable cultivation throughout the year. This town has attracted a small number of traders and artisans.

Regarding the duration of their residency in the study areas, we found that about 75% of the Ghanaian respondents lived for 5-20 years in the same community, whereas 65% of the respondents in Burkina Faso did so. About 5% of the Ghanaian respondents lived in the same community for more than 40 years whereas none did so in Burkina Faso.

The education level of the respondents was low in both countries as 57% in Ghana and 60% in Burkina Faso had no formal education. In Burkina Faso, a small portion of the respondents had completed primary education (20%) and junior high school education (10%). In Ghana, the percentages of primary education (16%) and junior high school one (12%) did not show much difference from Burkina Faso counterparts. Also, 5% of the respondents in Burkina Faso had tertiary education whereas 4% in Ghana did.

Table 1. Socio-demographic characteristics of the respondents

Socio-demographic s	Response category	Burkina Faso (%)	Ghana (%)
Age	18-29	18 (20%)	9 (6%)
	30-39	30	44 (30%)

		(33%)	
	40-49	19 (21%)	53 (36%)
	50-59	14 (16%)	32 (21%)
	60+	9 (10%)	10 (7%)
Gender	Male	45 (50%)	97 (66%)
	Female	45 (50%)	51 (34%)
Education	No formal education	55 (60%)	84 (57%)
	Primary	18 (20%)	24 (16%)
	Junior high school	9 (10%)	18 (12%)
	Senior high school	4 (5%)	17 (11%)
	Tertiary education	4 (5%)	5 (4%)
Occupation	Artisan	2 (2%)	0 (0%)
	Farmer	63 (70%)	146 (98%)
	Student	3 (3%)	1 (1%)
	Teacher	6 (7%)	0 (0%)
	Trader	16 (18%)	1 (1%)
How long (years) have you lived in this area?	5-10	9 (10%)	55 (37%)
	11-20	50 (55%)	55 (37%)
	21-30	24 (27%)	17 (11%)
	31-40	7 (8%)	14 (10%)
	41-50	0 (0%)	3 (2%)
	51-60+	0 (0%)	4 (3%)
Total		90 (100%)	148 (100%)

Authority (VBA). We also asked them whether they were aware of the code of conduct between Ghana and Burkina Faso. Finally, we asked them whether they knew of their status as key stakeholders of the VBA.

In response to the first question about awareness of the VBA, which began its operation three years after the formulation of the code of conduct, only 16% of the respondents in Burkina Faso and 9% in Ghana answered positively. With regards to the awareness of the code, 69% of the respondents in Burkina Faso knew of it. In Ghana, only 11% answered positively. Among those respondents who were aware of the VBA, only 9% knew of their status as key stakeholders in both countries, indicating the low awareness level of the respondents (Figure 2). That only 9% in both countries recognized themselves as stakeholders means that the VBA had largely operated as a top-down institution without much public engagement or participation. Regarding the higher level of awareness about the code of conduct among the respondents in Burkina Faso than those in Ghana, the reason can be at least partially attributable to the fact that the study area in Burkina Faso houses the headquarters of the Project for Improvement of Water Governance (PAGEV) that facilitated the establishment of the code (IUCN, 2009). This agreement preceded the establishment of the VBA in 2009.

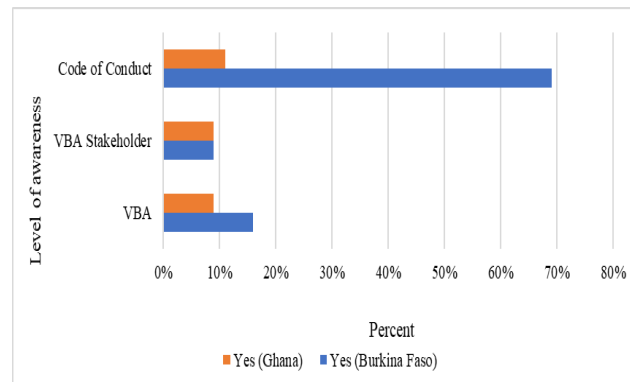


Fig. 2. Riparian communities' knowledge about the VBA and the code of conduct

Considering these results on awareness, we conducted a Chi-squared analysis to gain further insights on correlations with socio-demographic characteristics. A crosstabulation revealed a p-value less than 0.05 ($\chi^2=4.939$, $df=5$ and $p<0.05$) for gender (Table 2; Appendix 1). This means that gender had a significant correlation with respondents' awareness. More males (87.5%) than females were aware of their status as key VBA stakeholders in Burkina Faso. Similar gender differences exist in Ghana, but it was not statistically significant. This regional deviation could partly be

3.2 Awareness about the Volta Basin Authority and the code of conduct

In the second part of the survey, we attempted to understand respondents' awareness of transboundary water governance in the Volta Basin. First, we asked the respondents whether they knew of the Volta Basin

explained by the fact that men generally dominate in community meetings and external workshops that discuss issues about the Volta River Basin. Also, the presence of teachers and traders in Burkina Faso might have affected this result to some extent.

Table 2. Correlations between gender and respondents' knowledge about the VBA

Cross-tabulation	Gender (Ghana)	Gender (Burkina Faso)
Are you aware of the VBA?	0.903 (0.342)	3.045 (0.081)
Are you a VBA stakeholder?	0.903 (0.342)	4.939 (0.026*)
Have you heard about code of conduct?	2.014 (0.156)	0.210 (0.647)

About correlations between education and awareness, our analysis found a p-value of less than 0.05 in Ghana ($\chi^2=36.181$, $df=5$ and $p<0.05$). This means that education had a significant correlation with respondents' awareness. Among those Ghanaian respondents without formal education, 99% was not aware of the VBA. Those with senior high school and tertiary education, 35% and 75% knew of the VBA, respectively. Similarly, regarding the awareness of the code among the Ghanaian respondents, 95% of those without formal education did not know about it while 30% and 75% of those with senior high school and tertiary education did. Regarding their awareness of being key VBA stakeholders, 99% of those without formal education answered negative whereas 35% and 75% of those with senior high school and tertiary education gave positive answers.

In Burkina Faso, however, we found that education had a significant correlation only with respondents' awareness of being key stakeholders. Here, 98% of those without formal education did not know of their status of being key stakeholders, compared with 33% of those with junior high school education. Among those with tertiary education, 50% did not know of being stakeholder (Table 3; Appendix 2).

Table 3. Correlations between education and respondents' knowledge about the VBA

Cross-tabulation	Education (Ghana)	Education (Burkina Faso)
Are you aware of the VBA?	36.181 (0.000*)	7.406 (0.116)

Are you a VBA stakeholder?	36.181 (0.000*)	14.771 (0.005*)
Have you heard about code of conduct?	22.024 (0.000*)	2.421 (0.659)

Years of residency also significantly influenced respondents' knowledge as being key stakeholders. Among those who had lived in the study area for 11-20 and 21-30 years, 6% and 8% knew of their status as stakeholders, respectively. Also, 33% of those who had lived for 5-10 years knew about their status. Regarding the knowledge about the code of conduct, 92% of the respondents who had lived in the Basin for 21-30 years knew about it whereas 62% of those who had lived for 5-10 years were also aware ($\chi^2=8.443$, $df=5$ and $p<0.05$) (Table 4; Appendix 3). In Ghana however, no significant correlation was found with their years of residency regarding all three questions. This result suggests that, overall, all residents were not well-informed about the VBA.

Table 4. Correlations between years of residency and respondents' knowledge about the VBA

Cross-tabulation	How long have you lived along the Volta river? (Burkina Faso)
Are you a VBA stakeholder?	0.342 (0.049*)
Have you heard about code of conduct?	8.443 (0.038*)

Since stakeholder's awareness is essential for effective behavioral change (Koop et al., 2017) and appropriate and timely information dissemination enhances public awareness (Mayunga, 2007), these results may help water managers of the Volta Basin identify social aspects of water governance challenges to forestall possible conflict situations in the future. In particular, at least junior high school education is essential for all residents. For adult and elderly populations, community durbars, mosques, churches, and local chiefs (town crier) may play important roles in better informing riparian communities.

3.3 Riparian community's challenges in water governance

In addition to awareness, we tried to identify challenges the respondents face when they participate in water governance. Based on past studies and our field observation, we formulated a list of possible water governance challenges and presented these to them. The

respondents were asked to rank the challenges in order of importance (important, not important, not sure). The challenges presented to the respondents are: (1) inadequate enforcement of environmental regulations, (2) poor community participation in governance, (3) insufficient flood prevention, and (4) untimely information about spillage from Bagre Dam.

The result shows that the respondents in Ghana (96%) and Burkina Faso (97%) ranked the timeliness of spillage information as the most important. Our in-person interviews also found that farmers located below the Bagre Dam were left without sufficient information about the spillage. As a result, their farms were overly flooded, and their livelihoods were significantly affected. The second most important challenge was flood prevention with 92% in Ghana and 95% in Burkina Faso. The challenge of inadequate legal enforcement was also found high in Ghana (90%) and Burkina Faso (92%). Poor community participation was identified by 88% of the Ghanaian and 91% of the Burkinabe respondents (Table 5). Overall, these answers suggest serious governance failure in the two study areas. These findings positively correspond with past studies that found governance problems under the Volta Basin Authority (Opoku-Ankomah et al., 2006; Gao and Margolis, 2009; Obrecht and Mead, 2014; World Bank 2015; Yankey, 2019).

Table 5. Ranking of water governance challenges by the respondents

Challenges	Burkina Faso		
	Ghana		
	Not important	Important	I don't know
Enforcing regulation	5 (6%) 10 (7%)	83 (92%) 134 (90%)	2 (2%) 4 (3%)
Public participation	6 (7%) 12 (8%)	82 (91%) 131 (88%)	2 (2%) 5 (4%)
Flood prevention	4 (4%) 6 (4%)	85 (95%) 136 (92%)	1 (1%) 6 (4%)
Untimely information of spillage	2 (2%) 1 (1%)	87 (97%) 143 (96%)	1 (1%) 4 (3%)

IV. CONCLUSIONS

This research assessed the level of awareness and perceptions among Volta Basin Authority (VBA) stakeholders in Ghana and Burkina Faso. Our findings revealed that only a small portion of the respondents had a knowledge of the Volta Basin Authority and the existence

of the code of conduct. Concerning the awareness, most of the respondents in Burkina Faso (84%) and Ghana (91%) did not know about the VBA. Also, 89% of them in Ghana did not know about the code of conduct. Furthermore, 91% in both countries did not know that they were key stakeholders of the VBA.

Through statistical analyses, we found correlations between awareness and gender, education, and years of residency with some regional variations. More males in Burkina Faso were aware of being key VBA stakeholders. In Ghana, education appeared to have affected respondents' awareness. The respondents with senior high and tertiary education in Ghana tend to be aware. Years of residency in Bagre District of Burkina Faso showed a significant correlation to their awareness. Among those who had lived for 21-30 years in the study area, 92% knew of the code of conduct.

Regarding the four pre-identified challenges of water governance, more than 90% of the respondents in both countries similarly found seriousness of all these challenges. In particular, water spillage from Bagre Dam was the most pressing concerns. The other challenges are related to inadequate flood prevention structures and the inadequate enforcement of environmental regulations. All these suggest that the residents knew well about what challenges needed to be addressed to secure their livelihood, but they did not know how their voice can be represented on transboundary water governance matters.

If properly executed, the VBA can provide a powerful avenue for residents to express their needs and monitor progress. We recommend that the VBA regularly disseminate sufficient information about its potential roles to its stakeholders. Local transboundary committees already exist in these two study areas for different purposes. Therefore, a similar committee for water governance, especially on flood protection policies, should be formed by inviting representation from local communities. More women should be invited in local transboundary water governance committees and other water governance programs to improve their participation.

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CONFLICT OF INTEREST

We declare no conflict of interest.

DISCLOSURE STATEMENT

This research work did not receive any funding.

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Appendix 1. Cross-tabulation on gender, riparian awareness of VBA, being key a stakeholder?

Cross-tabulation	Response	Ghana		Burkina Faso	
		male	female	male	female
Are you aware of VBA?	no	86	48	35	41
	yes	10	3	10	4
Sub-Total		96	51	45	45
Are you aware you are stakeholder of the VBA?	no	86	48	38	44
	yes	10	3	7	1
Sub-Total		96	51	45	45
Have you heard about Code of conduct?	no	83	48	15	13
	yes	13	3	29	31
Sub-Total		96	51	44	44

Appendix 2. Cross-tabulation on level of education, riparian awareness about VBA, code of conduct and status as key stakeholder.

Cross-tabulation	Response	Burkina Faso (Ghana)				
		no formal education	JHS	SHS	Tertiary	Primary
Are you aware of the VBA?	no	51 (83)	6 (17)	3 (11)	3 (1)	13 (22)
	yes	4 (1)	3 (0)	1 (6)	1 (4)	5 (2)
Sub-total		55 (84)	9 (17)	4 (17)	4 (5)	18 (24)
Are you aware you are a VBA stakeholder?	no	54 (83)	6 (17)	3 (11)	2 (1)	17 (22)
	yes	1 (1)	3 (0)	1 (6)	2 (4)	1 (2)
Sub-total		55 (84)	9 (17)	4 (17)	4 (5)	18 (24)
Have you heard about Code of conduct?	no	14 (80)	4 (16)	2 (12)	1 (1)	7 (22)
	yes	39 (4)	5 (1)	2 (5)	3 (4)	11 (2)
Sub-total		53 (84)	9 (17)	4 (17)	4 (5)	18 (24)

Appendix 3. Cross-tabulation on years of residency, riparian awareness as key stakeholders and the code of conduct.

Cross-tabulation	Response	How long have you lived along the Volta River?				Total
		5-10	11-20	21-30	31-40	
Are you aware you are a stakeholder of the VBA?	no	6	47	22	7	82
	yes	3	3	2	0	8
Sub-total		9	50	24	7	90
Have you heard about Code of conduct?	no	3	20	2	3	28
	yes	5	29	22	4	60
Sub-total		8	49	24	7	88